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Chairman, EDAC Working Group I

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CIA Member

Intelligence on Soviet Bloc Position with Respect to Rolling Mills, Presses and Gear Making Machinery 1/

I. Rolling Mills (II-1305)

The slowdown in the growth rate of the steel industry in Soviet Bloc countries since 1955, most notably in the Soviet Union, clearly arises from an inability to provide from their common resources the capital equipment necessary for the attainment of the original goals. In particular, the provision of modern rolling and finishing equipment for the steel industry has long been neglected within the Soviet Bloc.

During the Fifth and preceding five year plans the Soviet Ministry of Ferrous Metallurgy concentrated its investment program on the construction and modernization of primary iron and steel making facilities. The Fifth Five Year Plan goal for the provision of new iron ore mining capacity was underfulfilled to the extent of 26 million tons. Although rolling and finishing capacities were expanded sufficiently to meet overall output goals, the objectives for all types of rolled products were rarely achieved. Much of the new capacity that was provided was not of most recent design and to a considerable extent was obtained from occupied countries. Little provision was made for modernization or for the introduction of rolling or finishing line equipment embodying advanced technology. At the end of the Fifth Five Year Plan (1955) the USSR had no continuous hot strip mills of its own manufacture in operation, only one small electrolytic tinning line, and no continuous sheet annealing or galvanizing lines. As of 1956, only one cluster mill was reported to have been installed in the Soviet Union. The Fifth Five Year Plan objective for the installation of new rolling mills was underfulfilled by 4.8 million tons of capacity, a shortfall of approximately 30%. The Soviet effort in 1954 to purchase 50,000 tons of modern rolling mill equipment in the West was in anticipation of this shortfall.

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The Sixth Five Year Plan of the Soviet Union provided for a production of 52.7 million tons of rolled steel in 1960, an increase of 51%, or 21.9 million tons over 1955, representing an average annual increase during the Plan period of 4.38 million tons. However, the recently announced goal for 1958 of 41.7 million tons of rolled steel, will, if achieved, provide an average annual increase of only 2.13 million

1/ For a summary analysis of the machine tool and industrial equipment industries of the Soviet Bloc see CIA NR-186, parts III, IV, and

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tons during the first three years of the Plan period. An annual increment of 5.5 million tons in rolled steel output, (more than double the rate thus far achieved) would thus be required to meet the original 1960 goal.

The overall increase of 51% in the output of rolled steel planned by the Soviets for the 1955/60 period, although quite large, does not adequately measure the magnitude and difficulty of providing the necessary rolling and finishing equipment. In previous plan periods, and, indeed, today, Soviet rolled steel output is preponderantly in the form of heavy products and the machine building plants serving the industry have specialized on equipment for such production. The Sixth Five Year Plan, however, provided for disproportionately heavy increases in the output of products requiring equipment which the Soviet Union has had little experience in manufacturing. The production of sheets under 3 mm. was to increase by 120%, of strip by 110%, of wire rods by 100% and of light sections by 90%. In the cold rolling and drawing category, the production of wire was to increase by 200% and cold rolled sheets by 300%. Output of electrical sheets was to increase by 120%, and in the militarily significant fields of stainless steels and high temperature alloys, capacity was to have been expanded 3.2 and 6 fold, respectively. All of these products require types of rolling mills that the Soviets have not heretofore manufactured in quantity. However, even in the category of blooming mills a shortfall seems probable in view of the failure of the Soviets to date to install a single high production continuous casting facility to meet their announced goal of 12 million tons of continuous casting capacity by 1960.

The Soviet capability of providing their steel industry with adequate rolling mill capacity from their own resources is further impaired by the apparently unanticipated magnitude of their requirements for equipment for the mining and processing of iron ore. As has been stated, the Fifth Five Year Plan goal for the provision of new iron ore mining capacity was underfulfilled to the extent of 26 million tons. Substantially all major new Soviet developments for the mining and processing of iron ore are behind schedule. The depletion of reserves of shipping grade ores combined with the Soviet requirement for high grade blast furnace feed to meet pig iron production goals and to lower coke consumption have created a need for unexpectedly large quantities of mining and beneficiating equipment. Since these items are manufactured by the same types of facilities, frequently in the same plants that produce rolling mills, they are in direct competition. It is not surprising that the Soviets in the summer of 1957, attempted to purchase in the United States iron ore mining, milling and processing machinery and services valued at \$400,000,000.

East Germany and Czechoslovakia are the only Soviet Bloc producers of significant quantities of rolling mill equipment other than the USSR. Their manufacturing capacity, estimated at 75,000 tons in 1955, may be sufficient to provide for their own expansion plans and to offset to

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some extent USSR commitments to other European Satellites, Communist China and to India. Even Czechoslovakia, however, has accomplished little replacement or modernization of its own rolling mill facilities; in December 1957 60% of Czech rolling mills were more than 10 years old and 68% more than 30 years old.

Although the infeasibility of providing the necessary capital equipment to attain the original 1960 goals has been implicitly recognized within the Bloc by the announcement of lowered objectives, the announcements have continued to reaffirm a policy of forcing the expansion of heavy industry by all available means. The current reduction in the rate of expansion of rolled steel output has in turn restricted the growth of those industries dependent on steel as a raw material. The procurement of modern rolling mills from non-Bloc sources would commensurately enhance the Bloc capability to accelerate the expansion of its military supporting industries not only by providing equipment now in short supply but also by releasing manufacturing capacity for the production of other items needed to balance the program. The release from control of certain types of specialty mills, would in addition, increase Soviet capabilities to meet the close tolerances required for aircraft and missile applications, a field in which their current capacity is particularly limited.

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**SECRET****II. Presses over 1000 Tons (IL-1072)****A. Models Produced**

The Soviet Bloc has built 25 types of mechanical, 12 types of hydraulic forging and bending presses, and one extrusion (1500 ton) press, with rated pressures between 1000 and 2500 tons.

Two new mechanical types are in the design stage; they are of 1600 and 2500 tons sizes.

In rated pressures over 2500 tons the Soviet Bloc has built the following presses: 2 types of mechanical, 4000 and 6000 tons pressures; 6 types of hydraulic forging and bending presses, 4000 to 6000 tons pressures; 3 types of extrusion presses of 3500 to 4000 and 5000 tons pressures.

Plans call for the building of two new mechanical types, one each of 8000 and 10,000 tons sizes.

The USSR has under construction at the present time (1957 information) one 30,000 tons hydraulic forging press and one 12,000 tons extrusion press.

**B. Production**

There is no information on the quantities of presses produced, other than minimal data for the extra large sizes suggested above.

**C. Trade**

There have been no exports during the past several years, of presses of 1000 tons and over class by the Soviet Bloc to the free world. USSR, East Germany, and Czechoslovakia have exported an indeterminable quantity of presses in this class to China including two extrusion presses of 5,000 tons pressure which were made in the USSR.

There have been no exports of these presses + to the Soviet Bloc from COMON members. Switzerland has the capability to export such presses to the Bloc, but is not known to have shipped any.

**D. Bloc Position**

Large presses (1,000 tons pressure and over) are produced in the Soviet Bloc only in the USSR, East Germany and Czechoslovakia.

The USSR is the largest producer of presses in the class above 2,500 tons pressure. But the USSR technology in the production of all presses, including the large presses, is not yet satisfactory.

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The Moscow Industrial-Economic Gazette (Promyshlennno-Ekonomscheskaya Gazeta) of 1 March 1957 complained that presses in all sizes made in the USSR were not as productive as desired, that their performance lagged behind that of the West, and that they were not as technologically advanced as those of the West.

East Germany is probably the Bloc's largest producer of presses in the 1,000 to 2,500 tons pressure class.

East Germany has been building the mechanical types up to 2000 tons on a "batch type production" of as many as 10 at a time. Most of this production goes to the USSR. (All types of presses over 2000 tons pressure have been built on a "custom built" scale - one at a time - in all the Bloc countries producing them.)

Czechoslovakia is probably the second largest producer of presses in the Soviet Bloc in the class of 2,500 tons pressure and over.

USSR and Poland are the most likely quantity customers for presses (over 1000 tons) from the West. This is due to their past short supply and the ambitious industrial expansion plans which are still taxing Blocability to provide large presses in time to meet schedules.

East Germany and Czechoslovakia will probably require smaller imports of large presses.

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III. Gear Making Machinery (II-1088)A. Models Produced

The number of models of gear making machines produced in the Soviet Bloc is listed below, separated into types of gears: bevel gear generating machines and hobbers, shapers, grinders, and shavers for spur and helical gears.

	<u>Spur and Helical Gears</u>				Bevel Gears
	Hobbers	Shapers	Grinders	Shavers	
USSR	20	11	5	6	9
W. Germany	7	3	6	1	4
Czechoslovakia	4	3	0	1	0
Poland	2	0	0	0	0

1/ Includes hobbers and shapers.

Only 12 of the 13 hobbers produced are for gears over 1200 mm (48") and the largest size is 5000 mm (200").

Shapers are produced in the following mm sizes: 75, 100, 200, 250, 450, 500, 900, 1800, and 2250.

Grinders are produced in the following mm sizes: 200, 300, 315, 500, 800, and 1250.

Shavers are produced in 200, 300, 355, and 450 mm sizes. Two machines for which dimensions are not available appear to be made for shaving small gears, probably less than 75 mm (3").

Bevel Gear Machines are made in the following mm sizes: 125, 275, 355, 450, 600, 750, 800, and 1000 with 5 of the models being in the 125 mm (5") size. The 1000 mm machine is in the prototype category, "to be finished in 1957."

B. Production

Information is not available on the numbers of machines produced in the above models, for the entire Soviet Bloc. In the case of the USSR, it is believed that since 1950 over 2,000 machines have been manufactured per year.

C. Trade

The Soviet Bloc is a net exporter of gear making machines, although its needs for a varied inventory of machines have not yet been met.

The principal exporting country is East Germany, whose sales of grinding machines to West Germany in 1957 - virtually its sole market - are estimated to have amounted to about \$1 million. East Germany exports gear grinders in the 315 and 500 mm sizes. A few large hobs in the 1500 and 3000 mm class are also exported.

Poland and the USSR have exported only negligible quantities of gear making machines to western Europe. A few machines have been sold in the Near East and to the underdeveloped countries of Asia. These exports have been small and entail shipments of one-of-a-kind machines.

Czechoslovakia has been advertising hobbing machines of 600 and 1000 mm with immediate delivery and 2500 mm size machines with "early" delivery. Actual quantities delivered are unknown; some have been sold to South America and a few may have been sold to the UK. Czechoslovakia also advertises 200 mm gear shapers for immediate delivery; the quantities sold are unknown.

The Soviet Bloc imports of gear making machines from the West are mainly from Switzerland, although West Germany was requested by Czechoslovakia in 1957 to provide it with 2 hobs of the same size that it advertises for export.

East Germany and the USSR have imported Maag 1/ gear grinders and gear planers, usually in the larger sizes.

D. Bloc Position

The Soviet Bloc position appears to be best in the hobber category.

The Bloc needs a greater variety of sizes of gear grinders. In the very small and in the very large sizes, the Bloc is still in a poor position.

The range of shaper sizes is fair and production in the smaller sizes (up to 250 mm) appears adequate for Bloc needs.

Although production of shavers is small and the number of models limited, there is no evidence of Bloc imports of this type machine to date.

1/ Maag is a Swiss concern.

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The variety of models of bevel gear machines produced is judged to be inadequate.

The greatest quantity of production is in machines for making pinions; the variety of models in the larger size does not appear adequate. 1/

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1/ West Germany requested permission in 1957 to ship 2 bevel gear generating machines in the 750 mm size to Czechoslovakia.

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